The U.S. Coast Guard Inland River Vessel Movement Center

Enhancing inland Maritime Domain Awareness.

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The U.S. Coast Guard Inland River Vessel Movement Center (IRVMC) is the primary source of Maritime Domain Awareness (MDA) on the western rivers of the United States. It provides accurate and timely information on the location and movement of barges carrying certain dangerous cargo (CDC). IRVMC monitors the movement of those CDC-carrying barges through high-density population areas and other smaller cities and towns scattered along more than 10,000 miles of western rivers. The information provided to Coast Guard Captains of the Port (COTP) is used daily to both plan and conduct Coast Guard operations.

A river towboat with load of hopper barges passes the St. Louis "Gateway to the West" arch. USCG photo by CDR Kenneth Hines.

IRVMC Genesis

As a significant MDA enhancement, the origins of the Inland Rivers Vessel Movement Center go back to 2001. Following the September 11, 2001 attacks on the United States, the Coast Guard established the National Vessel Movement Center (NVMC) in Martinsburg, W.Va. to track notice of arrival information from ships entering U.S. ports. Just 18 months later, the Eighth Coast Guard District identified a shortfall in Maritime Domain Awareness for the 10,000 miles of the western rivers and began a program to address this deficit.

The identified need was to heighten awareness and improve readiness to act upon

threats to inland river shipping. In particular, concern centered around barges carrying CDC through high-density population centers and the critical lock and dam infrastructures along major inland waterways. However, the data collected at NVMC did not specifically address the unique features of rivers such as the Mississippi and Ohio Rivers and major inland ports such as St. Louis, Memphis, and Louisville.

The majority of the Midwest's vast inland river system falls under the command of the Eighth Coast Guard District in New Orleans, La. The Eighth District faced decisions regarding what information to collect, what to do with this information, and who would operate a tracking center. Knowing how vital our inland river system is to the economic health of the United States, Coast Guard leadership created the Inland River Vessel Movement Center in 2003 to specialize in inland Maritime Domain Awareness. It was initially based in St. Louis, Mo., but is now operated from the USCG Navigation Center in Alexandria, Va.

Coast Guard Sector Upper Mississippi River in St. Louis. "In the event the Coast Guard needs to respond to a threat, the IRVMC data allows quick response against threats and hazardous conditions."

CDR Jerry Torok, commanding officer of U.S. Coast Guard Vessel Traffic Services Houston and one of the original architects of the IRVMC regulated navigation area, echoes that sentiment. "The IRVMC was designed to track CDC barges so the Captain of the Port can detect threats to these CDCs; escort as needed; and provide appropriate levels of security to the crew, cargo, and local community."

IRVMC Formation and Missions

The inland river MDA plan required near-real-time position reports from towboats pushing CDC barges and from fleeting areas where CDC barges were moored. By utilizing this information, the COTP could target boardings in accordance with the requirements of Operation Neptune Shield, a plan that

BMCM Jim Cunningham, IRVMC watchstander, uses one of the "low-tech" hard copy satellite overlays to review the next high density population area transit of a CDC barge movement. USCG photo.

LT Kevin Werthmuller, IRVMC deputy director, works to reconcile a reporting non-compliance issue. USCG photo.

The IRVMC is flexible enough to meet the particular needs of each Captain of the Port, as each port's issues vary. During high water conditions or heightened maritime security levels, CDC barge tracking is critical for crisis decision making. For example, when President Bush traveled to St. Louis prior to the 2004 election, the COTP and U.S. Secret Service's protective action plan specifically included tracking CDC barge movements. "Without the information provided to our office by the IRVMC, we would be blind to the CDC barge movements in our zone," said CAPT Suzanne Englebert, then commanding officer of U.S.

would eventually track more than 25 of the most hazardous cargoes moving along some of the most heavily traveled waterways in the world.

The first step was to establish a regulated navigation area (RNA) to track CDC barges (instead of tracking the towboats pushing them) and follow CDC barges that are dropped off at any of the more than 100 fleeting areas (large barge "parking lots" where barges are assembled together for movement up- or downriver) on the western rivers. This CDC barge tracking center operation encompasses 94 strategic checkpoints along the rivers to report transits through the harbors of more than 20 cities.

By using the RNA, the IRVMC incorporated three specific elements to provide the Captain of the Port with better Maritime Domain Awareness. The first element directed all towboats moving CDC barges through the regulated navigation area to notify IRVMC at least four hours prior to picking up a CDC barge, and again when initially getting that barge underway. Once underway, the second element required these boats to report reaching any of the 94 river checkpoints. These checkpoints included all Army Corps of Engineer locks and dams on the upper Mississippi and Ohio Rivers and navigation landmarks on the lower Mississippi River. The third element tracked the movement of newly picked-up or dropped-off CDC barges, by obligating fleets to report once every 24 hours. Through these three elements, each COTP could locate CDC barges in his area of responsibility at any time and have a clear picture of CDC barges approaching these zones.

Personnel at ISC St. Louis identified Coast Guard reserve officers and enlisted personnel and called them to active duty. This planning and development took place at the same time reserves were being sought in large numbers to assist during huge military outload operations at strategic ports across the U.S.

From the beginning, Coast Guard Reserve members brought to active duty proved to be a great asset to the IRVMC effort, due to their civilian skill sets. Fortunately, many of the original personnel identified were reservists who drilled at the NVMC in Martinsburg, W.Va., and were available for recall. Local reserve information technicians who were civilian computer programmers worked with the NVMC experts to develop a database of watchstander-entered movement data available for use by field units. These people were key to the initial success of the IRVMC, because they knew how to acquire data sets and were technically competent with the Coast Guard Enterprise Architecture as programmers. In addition, many of the reservists staffing the IRVMC were familiar with the towboat operating areas. These reservists brought their years of experience on the western rivers, which played a key role in the initial build-out and subsequent growth of the Inland Rivers Vessel Movement Center.

Growth and Development Through Industry Cooperation

With requirements and resources in place, the emerging IRVMC first figured out the best way to capture and report all the data to the Captains of the Port—where each CDC barge was, where it was going, when it reached one of the 94 mandatory reporting points, and its approximate time of arrival to its intended destination. In its infancy, the IRVMC resembled a 1970s vessel tracking center, making the most it could out of sticky notes, dry erase boards, and river charts to maintain situational awareness of CDC movements. Watchstanders manning the IRVMC 24 hours a day, seven days a week gathered and electronically entered information from telephone calls, e-mails, and faxes from towboat captains or fleet managers. This proved to be labor-intensive, since all data reported had to be manually entered into a Microsoft Access database by the respective watchstander.

Though initially slow, calls and reports gradually increased as RNA requirements were implemented and IRVMC reporting spread throughout the river industry. In 2005, more than 40,000 CDC barge movements were tracked, which equates to more than 100 per day. To keep up with this constant information flow, the IRVMC capitalized on its close working relationship with the river industry to tap into internal towboat company reporting capabilities.

Kirby Inland Marine and American Commercial Barge Line (ACBL) already had methods to collect position reports from their towboats underway. To help begin the automation process in an effort to eventually reduce IRVMC staffing, the IRVMC approached Kirby and ACBL, who agreed to provide the Coast Guard with these electronic position reports. In this way, Captains of the Port gained more frequently updated information to assess risk or river safety issues before a CDC barge approached or moored in heavily populated areas. Because the Coast Guard knew in almost real time where CDC barges were located, this information supported quicker, more decisive actions in mitigating threats to the dangerous cargoes.

IRVMC Matures

By Coast Guard standards, the three-year-old IRVMC is the "new kid on the block." It has already grown, however, by moving its database to the CITRIX farm at the Coast Guard Operations Support Center (OSC) in Martinsburg, W.Va. IRVMC also transmits its tracks to the Coast Guard's common operational picture (COP) at the Command and Control Engineering Center (C2CEN) in Chesapeake, Va., improving the quality and speed of COTP access.

The COP now gives the Captain of the Port an even

better picture of CDC barge transits by allowing the Captains of the Port to see beyond their zones and make security decisions with a larger knowledge base. Moving the database to OSC also created a better linkage to the Coast Guard's data network. Through near-term upgrades, the Marine Information for Safety and Law Enforcement (MISLE) database is replacing the commercial, off-the-shelf Microsoft Access database, improving functionality and allowing for growth in reporting capabilities.

Top Six Inland Rivers (2005)

	BARGE MOVEMENTS
Lower Mississippi	*6,621*
Ohio	*4,494*
Upper Mississippi	*1,067*
Arkansas	*978*
Illinois	*705*
Tennessee	*456*

In addition, the IRVMC program will allow the COTP user to simply highlight a track from the common operational picture on the computer screen to display the corresponding MISLE information. Both the MISLE and common operational picture improvements will improve the end users' ability to access and utilize the CDC transit and fleeting data.

Movement of CDC Barges (2005)

ANHYDROUS AMMONIA	*12,007*	(35%)
AMMONIUM NITRATE	*7,696*	(23%)
CHLORINE	*6,720*	(20%)
PROPYLENE OXIDE	*3,783*	(11%)
BUTADIENE	*3,021*	(8%)
BUTANE	*689*	(2%)
OTHER CHEMICAL	*46*	(1%)

Because of its technological concept and advancements in Maritime Domain Awareness, IRVMC was awarded the Commandant's Innovation Award in 2004 in the "Operations and Readiness" category. CAPT Kevin Gillespie, USCGR, the second IRVMC director, pioneered the use of technology to acquire a more meaningful MDA picture and to rapidly display critical information on CDC barges.

CAPT Gillespie also worked with headquarters staff to write the first bridging strategy to transition the IRVMC into a permanent entity, since reservists could not staff the IRVMC indefinitely. "There was an obvious need to secure the proper funding and develop a bridging strategy so that the IRVMC tracking capability would not be lost when reserve members would no longer be available to run the operation," said CAPT Gillespie.

What started as a low-tech, manpower-intensive security initiative evolved to become a true Coast Guard MDA success story. "While the unit was not initially expected to operate for more than a few weeks or a couple of months at best," says CAPT Michael Brown, the first IRVMC director. The unit is now at its permanent home at the Coast Guard Navigation Center in Alexandria, Va., and Center staffing transitioned from reserve personnel to contractors. In less than four years since first receiving CDC information, the IRVMC has matured; proved its usefulness, adaptability, and purpose; and found a permanent home and staff, setting the stage for its continued success.

About the authors:

CDR Hines is a reserve officer recalled twice to active duty since the terror attacks of 2001. His military specialty includes port security and he has served as director of the IRVMC since 2004. As a civilian, he is a bomb technician with a large fire department outside St. Louis.

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